

## Intended Learning Outcomes for Third through Sixth Grade Mathematics

The main intent of mathematics instruction is for students to value and use mathematics and reasoning skills to investigate and understand the world.

The Intended Learning Outcomes (ILOs) describe the skills and attitudes students should acquire as a result of successful mathematics instruction. They are an essential part of the Mathematics Core Curriculum and provide teachers with a standard for student learning in mathematics.

### **ILOs for mathematics:**

- 1. Develop a positive learning attitude toward mathematics.**
- 2. Become effective problem solvers by selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches to solve problems.**
- 3. Reason logically, using inductive and deductive strategies and justify conclusions.**
- 4. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using the precise language and notation of mathematics.**
- 5. Connect mathematical ideas within mathematics, to other disciplines, and to everyday experiences.**
- 6. Represent mathematical ideas in a variety of ways.**

Significant mathematics understanding occurs when teachers incorporate ILOs in planning mathematics instruction. The following are ideas to consider when planning instruction for students to acquire the ILOs:

#### **1. Develop a positive learning attitude toward mathematics.**

When students are confident in their mathematical abilities, they demonstrate persistence in completing tasks. They pose mathematical questions about objects, events, and processes while displaying a sense of curiosity about numbers and patterns. It is important to build on students' innate problem-solving inclinations and to preserve and encourage a disposition that values mathematics.

#### **2. Become effective problem solvers by selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches to solve problems.**

Problem solving is the cornerstone of mathematics. Mathematical knowledge is generated through problem solving as students explore mathematics. To become effective problem solvers, students need many opportunities to formulate questions and model problem situations in a variety of ways. They should generalize mathematical relationships and solve problems in both mathematical and everyday contexts.

**3. Reason logically, using inductive and deductive strategies and justify conclusions.**

Mathematical reasoning develops in classrooms where students are encouraged to put forth their own ideas for examination. Students develop their reasoning skills by making and testing mathematical conjectures, drawing logical conclusions, and justifying their thinking in developmentally appropriate ways. Students use models, known facts, and relationships to explain reasoning. As they advance through the grades, students' arguments become more sophisticated.

**4. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using the precise language and notation of mathematics.**

The ability to express mathematical ideas coherently to peers, teachers, and others through oral and written language is an important skill in mathematics. Students develop this skill and deepen their understanding of mathematics when they use accurate mathematical language to talk and write about what they are doing. When students talk and write about mathematics, they clarify their ideas and learn how to make convincing arguments and represent mathematical ideas verbally, pictorially, and symbolically.

**5. Connect mathematical ideas within mathematics, to other disciplines, and to everyday experiences.**

Students develop a perspective of the mathematics field as an integrated whole by understanding connections within mathematics. Students should be encouraged to explore the connections that exist with other disciplines and between mathematics and their own experiences.

**6. Represent mathematical ideas in a variety of ways.**

Mathematics involves using various types of representations including concrete, pictorial, and symbolic models. In particular, identifying and locating numbers on the number line has a central role in uniting all numbers to promote understanding of equivalent representations and ordering. Students also use a variety of mathematical representations to expand their capacity to think logically about mathematics.